

## CLAIMS

1. A peak power suppressing apparatus comprising:

5 a generation section that generates a multi-carrier signal in which data is superimposed on a plurality of carriers;

a conversion section that converts power of the generated multi-carrier signal with a non-linear function whereby an input value is mapped in a direction an absolute  
10 value becomes larger near the origin and the map of the input value gradually approaches a predetermined value as said map becomes distant from the origin; and

a transmission section that transmits the multi-carrier signal after the power conversion.

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2. The peak power suppressing apparatus according to claim 1, wherein the conversion section converts the power of the multi-carrier signal with the non-linear function using an arctangent.

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3. The peak power suppressing apparatus according to claim 2, wherein the conversion section converts power  $x$  of the multi-carrier signal to power  $y$  by equation:

$$y = a \cdot \tan^{-1}(b \cdot x)$$

25 where  $a$  and  $b$  are predetermined coefficients.

4. The peak power suppressing apparatus according to

claim 2, wherein the conversion section comprises:

a coefficient storage section that stores a coefficient of the non-linear function; and

an arctangent calculation section that performs an  
5 arctangent calculation with the power of the multi-carrier signal using the stored coefficient.

5. The peak power suppressing apparatus according to claim 2, wherein the conversion section comprises:

10 a parameter acquisition section that acquires a parameter providing an indicator of communication environment;

a coefficient determination section that determines the coefficient of the non-linear function based on the  
15 acquired parameter; and an arctangent calculation section that performs an arctangent calculation with the power of the multi-carrier signal using the determined coefficient.

20 6. The peak power suppressing apparatus according to claim 5, wherein the parameter acquisition section acquires at least one parameter from: power amplifier characteristics of the peak power suppressing apparatus; and the number of multiplexed codes, modulation level,  
25 or coding rate of the multi-carrier signal.

7. The peak power suppressing apparatus according to

claim 1, wherein the conversion section converts the power of the multi-carrier signal after approximating the non-linear function with a linear function.

5 8. A base station apparatus comprising the peak power suppressing apparatus of claim 1.

9. A mobile station apparatus comprising the peak power suppressing apparatus of claim 1.

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10. A peak power suppression method comprising the steps of:

generating a multi-carrier signal in which data is superimposed on a plurality of carriers;

15 converting power of the generated multi-carrier signal with a non-linear function whereby an input value is mapped in a direction an absolute value becomes larger near the origin and the map of the input value gradually approaches a predetermined value as said map becomes  
20 distant from the origin; and

transmitting the multi-carrier signal after the power conversion.